

Earth & Environmental Sciences Division

News, Views & EE**S**cience

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Safety

SAFETY SMART! IS A NEW RESOURCE FOR HEALTH AND SAFETY INFORMATION

A Message from Jeff

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Need some general information on hazards located in your office, work area, or home? Check out the new "Safety Smart!" This is the new web page that HSR has recently published at <http://eshapps.lanl.gov/safetysmart/>.

(1) "Safety Smart!" is a commercial product that contains general information on a variety of hazards, PowerPoint presentations, clip art, tips for supervisors, and other useful links. You can also access issues of "Safety First Magazine."

More on Safety

(2) The Laboratory has a new **Chemical** inventory system called ChemLog: <http://int.lanl.gov/safety/chemical/index.shtml>

It replaces the old ACIS system. The data in ACIS should transition to ChemLog, but the Laboratory requires that users check, and line managers validate the inventory and update ChemLog by June 2003. The importance of this system is illustrated by the fact that when

we had a gas leak outside of one of our buildings last Fall, the emergency team that responded did not know of the chemicals in that building because the inventory was not up-to-date in ACIS and related data bases. The Emergency Management Response Team will now use ChemLog to get up-to-date information in such cases.

Security

A Message from Tony

Tony Montoya, Acting Division Security Officer (DSO), 7-8065, antonio@lanl.gov

I have been told that the new, "**Computer access requirements 982**" form will again be rolled out in March. The date is March 10. The old form is still on line. I'm assuming that we will have **90 days** in which we must have the paper work submitted for all Foreign Nationals using the new form. I'm hoping that all hosts of Foreign Nationals will be available to help fill out the paper work.

More on 982s

The saga continues on the 982 forms that we use for foreign nationals. A new process was announced, a new form was distributed, and then everything reverted to the original form while the powers-that-be revisit the process. The problem: insufficient input from stakeholders. We are told to expect the new, new versions around 10 March. Until we hear differently, I recommend, as always, moving forward on 982 and other long-time scale submittals well ahead of time.

Pajarito Road Update

The proposal to close Pajarito Road to uncleared individuals under **SECON 2+** or

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higher security conditions has encountered a roadblock (sic): there are a large number of uncleared people who work or regularly visit along that segment of the road! For EES, I have **established a policy** that all employees who are eligible for a clearance must immediately apply for a clearance (exceptions granted only by the Division Leader). We have access to a reasonable number of clearances right now. Upgrades from “L” to “Q” are also encouraged.

EES Organizational News

EES-9 Welcomes Andrew V. Newman

Andrew V. Newman received his Ph.D. in Geological Sciences, specializing in Geophysics, Northwestern University, Evanston, IL in 2000. Andrew came to the Environmental Geology and Risk Assessment Group, EES-9, in September 2002 as a Director's Postdoctoral Fellow to develop advanced numerical models of deformation in silicic volcanic systems using viscoelastic rheologies. The focus of this study concentrates on Long Valley Caldera in Eastern California because of the abundant existing deformation data there; however, Andrew is now performing pilot GPS deformation studies of both the Valles Caldera (immediately west of the LANL) and the Socorro Magma Body (beginning 50 km south of Albuquerque), to determine if there exists suitable deformation signals to monitor more closely. For the two years prior to coming to LANL, Andrew, as a postdoctoral Researcher at the University of California Santa Cruz, has been working on a joint seismological and geodetic experiment in Costa Rica to establish a more complete understanding of the coupling between subducting oceanic and overriding continental lithosphere, the region where most of the world's great earthquakes occur.

EES-11 Welcomes Richard J. Stead

Richard Stead received his Ph.D. in Geophysics from California Institute of Technology in 1990. In December of 2002, he was hired as a

Technical Staff Member in the Geophysics Group, EES-11. His specialty is seismology and his background includes more than 12 years experience related to nuclear explosion monitoring. Before joining EES-11, Richard worked for SAIC at the Department of Defense's Center for Monitoring Research, where he filled various positions including Director of Operations and Principal Scientist; he played a key role in creating and operating the systems that monitor the Comprehensive Nuclear Test Ban Treaty. He brings broad experience in monitoring operations and systems to the Laboratory. His research interests include sensor arrays, wave propagation, and source characterization.

Financial

Good news!

Bill Press has approved \$50K of G&A funding from the Reinvestment Account for our division for the **Second North American Luminescence Dating Workshop**. Ken Lepper and Cathy Wilson will lead this activity. We await resolution of other G&A awards.

The Fiscal 03 budget is finally resolved. Overall, **the outcomes are good for us: Yucca Mountain** received \$460M nationally (allowing faster progress toward Licence Application) and there is also extra money for accelerated cleanup of the Los Alamos site and for characterization of our nuclear waste to go to **WIPP**. Homeland Defense is slated to get some very significant money for Research and Development (**Action** to program managers to get the details and get us slices of the pie!). On the negative side, **Oil and Gas** partnership funding is **greatly reduced** (we have started an initiative to get longer-term funds in Fossil Energy to replace the Partnership money). Overall, the Division budget for FY-03 is fine at this time: almost everyone who should work on technical matters is doing so now.

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The President has issued his budget for FY-04: <http://www.mbe.doe.gov/budget/04budget/> Of course, this will now go to Congress, and the final product will, undoubtedly, differ from this blueprint; however, it shows the priorities of the Administration.

I have also started fortnightly meetings of our **Program Managers and Focus Team Leaders** to facilitate sharing of pertinent information from various sources. Much of this information is never written down anywhere and this is important as we take responsibility for sponsor relationships for most of our portfolio. We will also ask Program Managers to report periodically to the Division Leadership Team (just as we have the Group Leaders who provide overviews of the Groups to DLT.)

Good news on **buildings!** The Laboratory Director and UC have agreed to actively go forward with Third Party Financing for buildings starting with an EES/T complex. To quote Director Nanos: “UC will act as a magnet.” And, for those in TA-3, I stumbled across a request for bids for a 400-space, \$3.5 - \$4M Parking Structure: <http://bus.lanl.gov/bus5/vendor/solicitations/69118/default.htm>

Welcome to EES-6 - Below (Watch your Step, Please!) It looks like we might be in line for a new building!



Update on Operations

Interim Director Nanos - Taking Steps Toward Improvement

*I*nterim Director Pete Nanos has taken many steps toward improving our operations. Some 159 of 189 Group Leaders in the Laboratory participated in meetings and surveys to identify improvements in Group operations. Division Leaders were also asked for input on this topic. Changes are in the works for the Groups: see Pete Nanos e-mail of 20 February. I have also asked our Group Leaders to look carefully at each Group's operations and to suggest improvements to me.

In addition, Nanos will soon look at the **Division Offices** and the **Division Leader job** to see how we can do better, in this job. Constructive suggestions are always appreciated!

Pete also told managers that he expects greater **formality of operations** (I'm applauding as I type). A specific example that he used is that when a sponsor asks for significant changes in scope, Pete wants us to get a request for change in writing, then we are to compute the impacts and negotiate a new cost, scope and schedule. And, of course, promises need to be in writing and promises need to be kept on all sides.

The Divisions also rolled up the inputs from the special nested safety committee meetings for the Director. Several messages came through loudly and clearly from almost all of these meetings: **traffic safety, parking, timeliness of getting things fixed, timeliness of response for items passed “up the chain”, inaccuracies in data bases, and complicated and inconsistent rules and regulations** located in many places. I have seen some of the inputs from other divisions, and the story is consistent. The Laboratory responses will be interesting.

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Additionally, we were also asked to complete a questionnaire on **Quality Assurance** and Quality Control for a Lab-wide Initiative.

A word about Property

The property wall-to-wall audit is off to a very rapid start. Please take the time **NOW** to locate your property, sign your property statement, and work hard to find anything that is missing. As of the time of writing (21 February) our Division is quite a way from where we need to be.

News from the **S**cience and **E**ngineering **L**eadership **T**eam (SELT)

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The **SELT** focused on three tasks in February: how to improve the SELT's role in assisting with Division Laboratory Directed Research & Development Directed Research (LDRD/DR) proposals; how to provide input from staff to Director Nanos' efforts to address Laboratory operations; and scheduling upcoming events in the fall. A memorandum was sent to the Division clarifying the **SELT's role in the LDRD/DR process** and requesting feedback. A second memorandum is being revised for distribution to the Division soliciting input relative to Laboratory operations. A schedule is being developed for upcoming speakers, with an emphasis on homeland security.

Paul's Management Walk Arounds

My February **W**alk Arounds took me to the EES-11 and EES-2 transportables to the south of Physics Complex. I was pleased to have the opportunity to chat to all those folks who were busy at work on a Friday afternoon before the President's Day weekend. I was especially pleased at the cognizance for ergonomics displayed by several people.

Speaking of **E**rgonomics, the Division Leadership Team had a segment with Graciela Perez, HSR-5, who is the Laboratory's Ergonomist. We gained some new insights, and I volunteered for us to be part of a **new Web-based ergonomics evaluation and assistance tool**. Jeff Hansen will take some new training to help, too. We also complained of slow deliveries of ergonomic equipment and discovered that most of the delay is outside the Laboratory and that there is a work-around through a loan program operated by Dr. Perez. Appointments with Dr. Perez or more information is available @ ergonomics@lanl.gov

Service Anniversaries Congratulations to the Following:

Alex Salazar, EES-DO – 35 years
Joe Yepa, EES-11 – 20 years
Michael Begnaud, EES-11 – 10 years
Aaron Lai, EES-2 – 10 years
David Reass, EES-2 – 5 Years

I also had the pleasure of participating in the **thirty-year service recognition** event on 20 February. Our honoree was **Bill Porch**, whose thirty years are actually split between LLNL and LANL. Bill's main efforts at LANL have been in transport and diffusion of materials in complex terrain, and in cloud / climate feedbacks. He is especially proud of his original work on trails of clouds formed at ships or islands.

Weekly Highlights / Accomplishments sent to ADSR

LANL Names Ardyth M. Simmons New Program Manager for Repository Science

The Division Leader for the Earth and Environmental Sciences Division, Paul G. Weber, announced the appointment of Ardyth M. Simmons, Ph.D., as LANL's Program Manager for Repository Science. Ardyth is presently the Program Manager and Principal Investigator

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in the Earth Sciences Division at Lawrence Berkeley National Laboratory (LBNL). At LBNL Simmons manages both geology and natural analog studies for the Yucca Mountain Project (YMP), and she is also the manager and lead author of the Yucca Mountain Site Description and Natural Analog Synthesis Report. **Simmons will coordinate and manage the Yucca Mountain work at Los Alamos,** working closely with Paul Dixon (who remains the primary Yucca Mountain Program Manager and on assignment in Las Vegas, NV). **She will also represent Repository Science for Yucca Mountain and the Waste Isolation Pilot Plant (WIPP).**

Zero-Emission Carbon-Necessary and Achievable

The latest issue of ECOStates: Journal of the Environmental Council of States (Winter 2003) includes the article “Zero-Emission Carbon—Necessary and Achievable,” by **Hans-Joachim Ziock** of Los Alamos National Laboratory’s Earth and Environmental Sciences Division, Alan Johnson of the Zero Emission Coal Alliance, and Klaus Lackner, Ewing-Worzel Professor of Geophysics, Department of Earth and Environmental Engineering, Columbia University, New York City.

“The controversies over the details of global climate change are in danger of obscuring an important fact: even without considering climate change, the world is rapidly approaching critical carbon overload in our atmosphere,” the authors state in the article.

“Important fossil fuel usage will have to be eliminated, or a means will have to be found of achieving zero emissions for fossil energy in all sectors of the economy. The development of zero-emission carbon needs to become a large national and international effort and requires strong support from industry, academia, and state and federal governments.”

ECOS’ Web site URL is <http://www.ecos.org>.

LANL’s Material Disposal Area P Milestone Reached

On January 31, 2003, the “Material Disposal Area – P (MDA-P) Area Closure Certification Report” was delivered to New Mexico Environmental Department – Hazardous Waste Bureau. This three-volume report included clean closure certifications for The TA-16 MDA-P landfill and the 387 Flash Pad, and the Voluntary Corrective Action report for the adjacent consolidated Solid Waste Management Unit (SWMU) 16-016(c)-99. Meeting this regulatory deliverable milestone also meets the requirements of a LANL Appendix F Performance Measure. **The Earth & Environmental Sciences Division is a major contributor to these efforts.**

Japan Atomic Research Institute Tours Yucca Mountain

Richard Kovach, Earth and Environmental Sciences Division, conducted a tour of the Yucca Mountain Project on February 13 for the Japan Atomic Research Institute. Fujiyasu Nomura, Director, Office of Auditors, and Kaoru Naito, Senior Auditor, both from Japan Atomic Research Institute, and Richard Spence, DOE, Office of Project Execution, Deputy Assistant Manager attended the tour. The Institute is interested in our program at YMP as they study the disposition of spent nuclear fuel from their commercial nuclear reactors.

Meteor Impacts

The findings of catastrophic meteor strikes by **Douglas ReVelle**, of the Earth and Environmental Sciences Division, and his colleagues from Sandia National Laboratories, the University of Western Ontario, ET Space Systems, and the U.S. Space Command were published in the November 21 issue of Nature. Infra-sound detectors (small microphones) used by Los Alamos for “listening” for clandestine nuclear tests played a key role in helping

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scientists to more accurately determine how often Earth is hammered by giant meteors. The Laboratory's infrasound arrays are tuned to detect ultra low-frequency and very small amplitude waves. The Earth and Environmental Sciences Division operate five infrasound arrays across the western United States that routinely monitor and locate global atmospheric explosions.

Interagency Geotechnical Assessment Team Activities in Washington

Scientists from the Earth and Environmental Sciences Division (EES) participated in the Defense Threat Reduction Agency's, Interagency Geotechnical Assessment Team (IGAT) meeting held in Arlington, VA on February 13 and 14, 2003. The meeting was focused on "Remote Sensing Applications to Geotechnical Site Characterization". EES participants were **Wendee Brunish** and **Ward Hawkins**. The IGAT provides support to STRATCOM and others in the form of site-specific and regional geological characterizations. Earlier in the week Hawkins participated in a meeting of the IGAT's Material Property Working Group that develops data on specific locations of interest. Hawkins is a member of the IGAT steering committee. On 12 February, Brunish and **Christopher Bradley**, EES, briefed Rick Smith of the Defense Threat Reduction Agency at the Defense Intelligence Agency's, Underground Facilities Analysis Center.

Awards

Patent & Licensing Award Ceremony

We honored Innovation at the Patent and Licensing Awards Ceremony on 13 February. Our EES honorees are:

Royalties (30% goes to the inventor, 50% to the Division):

Yamada Tetsuji: Higher Order Turbulence Model for Atmospheric Circulations and Random Particle Transport and Diffusion (HOT-MAC / RAPTAD)

Bill Carey and George Guthrie, EES-6: Superconducting Composite Structures

Bill Carey and George Guthrie, EES-6: Detection of Alkali-Silica Reaction Swelling in Concrete by Staining

Patent: #87,250 12/18/2001 **Paul Johnson, Jim Tencate**, EES-11, Koen E. A. VanDen Abele and Robert Guyer: Resonant Nonlinear Ultrasound Spectroscopy

Announcements

Where's the Water?

Los Alamos National Laboratory will cosponsor the spring New Mexico Geographic Council (NMGIC) meeting "**Where's the Water?**", an examination of water resource issues in New Mexico from a Geographic Information Technology (GIT) perspective. The meeting will be held **April 24-25 at the Los Alamos Research Park**. Meeting details are available on the NMGIC website (<http://nmgic.unm.edu>). For more information, contact **Paul Rich** (pmr@lanl.gov) or **Cathy Wilson** (cjw@lanl.gov).

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Guest Editorial

Evaluation of Monitoring Technologies for Nuclear Testing

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With an extensive background in monitoring and verification of nuclear weapons treaties, DOE and its laboratories look to the future of potential, unilateral, bilateral, and multilateral agreements/treaties, concerning site-specific monitoring of nuclear tests (called Nuclear Testing Limitations-NTL within DOE/NA-241). To make this monitoring and verification experience useful for future application, it is necessary to critically assess monitoring technologies from the standpoint of their capabilities and relevance to specific monitoring objectives. Accordingly, we have taken stock of these technologies, considering their basic characteristics, historical applications, and strengths and weaknesses in order to perform an effective evaluation. The approach we use for this evaluation consists of a matrix that compares technologies on the basis of a number of criteria known to be important for policy considerations.

Monitoring technologies are many and varied, but of these technologies there is a subset that has both a direct application to nuclear testing and a precedent. Four general groups of monitoring techniques have played a role in nuclear test site monitoring (TSM) treaties and agree-

ments, involving the USDOE. They are: (1) geophysical measurements; (2) ground-based visual observations; (3) overflight observations; and (4) radiological assessments. Geophysical technologies involve the use of sensors designed to detect signals associated with the detonation of explosives and to provide data for the identification and characterization of residual phenomenological signatures of explosions. Ground-based visual observation techniques primarily involve mapping to graphically document spatial data concerning location, dimensions, and characteristics of visible geological, cultural, and environmental features. Mapping also provides a basis for determining geophysical and radiological sensor emplacement, and data acquisition and interpretation. Overflight technologies involve site-specific aerial observations and imaging, Open Skies Treaty overflights, and commercial satellite imagery. Radiological technologies involve direct measurements and sample analysis to detect and characterize nuclear events. Samples may be acquired by collection of material transported in the atmosphere and by environmental sampling. In summary, these technologies can monitor a very wide range of phenomena associated with activities at nuclear test sites (Figs. 1 and 2). Some of these signals can be definitive on their own, while others are important to a synergistic analysis of an ensemble of different signals.

Monitoring technologies have strengths and weaknesses depending upon the monitoring objectives and the circumstance under which they are implemented. Accordingly, we developed evaluation criteria that are based upon an extensive review of issues that have received specific attention during implementation considerations and treaty-related negotiations, and thus have precedence. We considered a large number of viable evaluation criteria that are intended to capture the critical concerns in determining the desirability of a potential monitoring technology.

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While the future will bring new technologies that bear upon nuclear test monitoring, we wish to apply our experience from past nuclear explosion monitoring efforts to define the general technologies and equipment used for nuclear test monitoring. In doing so, we present a distillation of our experience that reflects not only our point of view regarding relevance, feasibility, and applicability, but also what we have learned from the opinions expressed by experts from other countries.

Fig. 1: Field-portable geographic information system with sensor connections, telemetry receiver, and data loggers. A field information management system based on this example design simplifies utilization during monitoring because it does not require a dedicated indoor space and power supply.



Fig. 2: Aerial view of the U1a test facility at the Nevada Test Site. An evaluation of surface visual technologies notes a low detection sensitivity (unlikely to see features produced by a underground, low-yield or sub-critical test) and a very high discrimination threshold (difficult to discriminate significance of signals if monitored). Whereas surface visual technologies are given a low priority, subsurface visual technologies are highly desirable for monitoring this test environment.



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Dottie's **Mystery** Image:

Is this **WIPP, YMP?** or the repair of the **Trans Atlantic tunnel**???

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**News, Views & EEScience: A
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